ment of Berzelius's prompt and cordial acquiescence in his wish :—

"Wie sehr freue ich mich auf diesen Winter," he writes, "wo ich mich einmal so ganz *con amore* der Chemie ergeben kann, ohne die Zeit in andere, mehr oder weniger fremdartige, nicht so ansprechende Studien theilen zu müssen."

Wöhler remained about a year in Stockholm ; he was wont to speak of his stay with Berzelius as "eine nicht zu berechnende Wohlthat." As to Berzelius, no one of his pupils lay nearer to his heart than Wöhler.

In the selection of his letters it is obvious that Dr. Hjelt has been loyally mindful of the condition imposed by Wöhler. Doubtless much of the correspondence had reference to letters of Berzelius, and therefore to matters which the world can only know of in the twentieth century. The letters which we are permitted to see have, however, a great interest from the light they shed on the writer's character, and from the accounts they give of the origin of those fruitful discoveries which have made the names of Liebig and Wöhler inseparable. How that partnership originated need not be told again. It seems, however, that in more than one letter Berzelius had expressed his conviction that Wöhler's share in the work was but imperfectly recognised. That Wöhler was, in fact, the mainspring of much of their labour is now known, but he himself writes, "What matters it, however, when the business in hand profits thereby, and such is assuredly the case. We two, Liebig and I, have dissimilar kinds of talent ; each, when in concert, strengthens the other. No one recognises this more fully than Liebig himself, and no one does me greater justice for my share of our common work than he."

In the following letter we get a glimpse of Liebig's mode of work :—

"The days which I spend with Liebig slip by like hours, and I count them as among my happiest. His apparatus for organic work seems to me most excellent, and he is a master, of almost pedantic exactitude, of organic analysis. But in all that relates to inorganic analysis, as, for example, filtration, use of lamps, &c., one sees throughout the imperfect French methods. He uses neither a filter-stand, nor good filters, nor usually a lamp. . . ."

Liebig's earnestness, and restless energy, and fiery impulsiveness, brought him unfortunately into frequent conflict with his contemporaries. It was almost inevitable that he and Berzelius should sooner or later come into collision. Nothing in the letters is more charming than the manner in which Wöhler sought to maintain peace between his friends, constantly seeking to excuse the one to the other. He writes of Liebig to Berzelius :—

"He is thoroughly upright, honourable, and generous, but passionate and inconsiderate."

At another time he wrote :—"He who does not know him intimately would hardly realise that at bottom he is one of the most good-natured and best fellows in the world."

It is somewhat remarkable that Wöhler, although trained in a school of which analysis was made the predominant characteristic, should have failed to discover any new elementary body, even whilst constantly occupied with the examination of rare minerals. We all remember the story of Vanadis and the "Schalk" Wöhler, who failed to woo her with proper assiduity. It now appears that the element thorium also slipped through his fingers unperceived. "Also," he wrote, "eine analoge Geschichte mit dem Gotte Thor, wie mit dem Göttin Vanadis." Wöhler's triumphs were won in organic chemistry. "The organic chemistry of to-day," he wrote in 1835, "is enough to make one quite dazed. It is like the primeval forest of the tropics, full of the most curious things ; an immense thicket without exit and without end."

One of the most historically interesting letters of the series is that in which he communicates to Berzelius his memorable discovery of the synthesis of urea—"ohne dazu Nieren oder überhaupt ein Thier, sei es Mensch oder Hund, nöthig zu haben." It now appears that the transformation of ammonium cyanate into a body which gave no reactions for either cyanic acid or ammonia was observed by Wöhler whilst in Stockholm, but the significance of the change escaped him for the time. How, almost accidentally, he returned to the subject, and how by three or four decisive experiments he establishes the nature of the new body, is shown in the letter. Berzelius had not then invented the word "isomerism." For a time, indeed, his conservatism rebelled against the conception. Wöhler's words in reference to urea—"This is therefore an incontestable example that two absolutely dissimilar bodies can contain the same proportion of the same elements, and that it is merely a difference in the mode of combination which brings about the dissimilarity in their properties"—must have paved the way for Berzelius's conversion. How strange, too, the following sentence must have sounded in 1828 ! "May not this artificial formation of urea be regarded as an example of the production of an organic substance from inorganic materials ?"

The witty and sarcastic letter which appeared in the *Annalen* for 1840, in which "S. C. H. Windler, aus Paris," sought to ridicule the substitution theory of Dumas, was at the time generally ascribed to Liebig, but we know now that it was written by Wöhler for the amusement of Liebig, "ohne dass ich aber im Entfernsten daran dachte dass er so toll sein wurde ihn in den Annalen Abdrucken zu lassen."

Wöhler not unfrequently amused himself and his friends with *allotria* of this kind. The well-known flash which attends the crystallisation of plate sulphate of potash was on one occasion thus explained :—"Die Lichtfunken bei krystallisirenden Salzen hängen mit einer gleichzeitig im Krystall vor sich gehenden isomerischen Umsetzung der Bestandtheile zusammen, z. B. ein krystallisirtes Schwefelsaures Kali könnte eigentlich unter gewissen Umständen KSO_4 or KO_3SO geworden sein. Nun aber arrangiren sich plötzlich die Atome zu $KOSO_3$ und dabei blitzt es, weil in dem einem Falle Kalium zu Kali, und in dem anderen unterschweflige Säure to Schwefelsäure verbrennt. Ich will diese Idee an Kastner verschenken."

Berzelius died on August 7, 1848, after a long illness. Almost his last words had reference to Wöhler. Wöhler always spoke of their friendship as one of the brightest memories of his life, and we are told that even to the last the eyes of the old man would glisten when the name of Berzelius crossed his lips.

T. E. THORPE

AMERICAN STORM WARNINGS

THE Meteorological Office, through the co-operation of the Chief Signal Officer of the United States War Department, has commenced to issue notices of the current Atlantic weather, and it so happens at the very commencement of the system that the frequent occurrence of storms in the vicinity of the British Islands, as well as out in the open Atlantic, has afforded a favourable opportunity for testing the value of this extension of our weather knowledge. As a specimen showing the nature of the information, we append a copy of the notice issued on December 19 :—

"The Chief Signal Officer at Washington, U.S., reports that, at 4 a.m. on the 16th inst., in lat. 42° N., long. 60° W., with the barometer at 29·4 inches, there was a fresh gale from south, veering to west."

A subsequent notice was issued, showing that the same storm was met with eight hours later, and had advanced rapidly to the east-north-eastwards. It appears highly probable that the disturbance in question was the same

© 1885 Nature Publishing Group

as that which passed swiftly across our islands during the night of the 19th to 20th, and had its centre off Yarmouth at 8 a.m. on the 20th, having travelled about 2600 miles in four days and four hours, or at the rate of twenty-six miles an hour. This rate is somewhat high for an average extending over so long a period, but it is in accordance with former experience for an isolated storm-centre, and is fully supported by the high rate of progress the storm had when traversing England. The barometrical gradients in the rear of this storm were very steep, and the difference of pressure was accompanied by a heavy gale on the 20th over the whole of the southern portion of our islands.

We are glad to see that the Meteorological Council are taking steps to ascertain the atmospheric changes which are going on over the Atlantic, since the weather of that ocean has such an important bearing upon that of the British Islands. It is now no longer a matter of speculation as to where the weather comes from which strikes our coasts, but the synchronous charts which have been prepared by the Meteorological Office, both under Admiral FitzRoy and the subsequent governing body, as well as by Leverrier, Hoffmeyer, Neumayer, and the Signal Service of the United States, amply prove that in the north temperate zone of the Atlantic, at least, there is a regular movement of the weather-systems from west to east, or, more strictly, from some point between west and south-west towards east and north-east. These weather-systems not only embrace storm areas, but, to a very large extent, all the ordinary weather changes. It is our intention here, however, to limit our remarks to the question of storms and unsettled weather, as not only being of primary importance, but the conditions with such weather will, although of a more pronounced type, illustrate in a very great measure almost all other meteorological changes.

Probably the enterprising proprietors of the *New York Herald* have done more of late years than all other authorities put together to popularise the fact that our weather changes traverse the Atlantic, but the notion, if nothing more, of the easterly translation was in existence 180 years ago, for Daniel De Foe, in his discussion of the great storm of 1703, inclines to the opinion that it came from America, since, as he says, "they felt upon that coast an unusual tempest a few days before the fatal 27th of November."

The United States Signal Service has for several years past published monthly track charts of all storm-centres in the North Atlantic, and the most cursory examination of these is sufficient to prove that very valuable information might be transmitted to Europe from America with respect to the weather experienced by trans-Atlantic steamers on their outward passage. Prof. Loomis, who has devoted considerable attention to the tracks of Atlantic storms, has calculated the average velocity of storm-centres in the Atlantic Ocean to be fourteen miles an hour, and has shown the rate of progress to be less over the sea than over either America or Europe. Some other authorities have given rather a higher rate of progress than Prof. Loomis, but when a large number of instances is taken it will not be found that the average rate exceeds twenty miles an hour, and probably this rate is the safest that our present knowledge of the subject will allow. The charts of the United States Signal Service for 1879, which exhibit the tracks of ninety-two distinct storm-centres in the Atlantic, show the average rate of progress of all these storms to be eighteen miles an hour. From this it will be seen that, with the speed now attained by many of our principal steam-vessels engaged in the trans-Atlantic trade, if a storm is met anywhere to the westward of the mid-Atlantic, a vessel can, on arrival at a port in the United States, transmit timely notice to Europe that a storm has been experienced, and such notice will serve as a caution to our home authorities to be on the alert for any evidence of our outlying stations indicating the approach of the storm until its subsequent arrival, or until ultimate proof is obtained that it will not strike our shores. The fact that a storm is blowing out in the Atlantic will also probably be valued by commanders of vessels who are leaving port bound westwards.

The Atlantic gales differ so materially from each other in their character that any information which will convey the nature of an impending storm, either to vessels outward bound or to those engaged on our coasts, will be of the highest importance. It sometimes happens that the whole of the northern part of the Atlantic is taken up with one vast disturbance, the wind blowing with the force of a gale over an area having a diameter of upwards of 1500 miles, and occasionally extending from the coast of America to Europe. On the other hand, several disturbances may exist at one time between the two continents, and in this case a vessel is no sooner out of one storm than she enters the margin of another, and these conditions may last throughout her passage. This will be readily seen from the synchronous weather work already referred to; and, if further proof is wanted, it is to be found in the frequency with which storm-centres pass either over our islands or in their immediate vicinity, and in sufficient proximity to influence our winds and weather, if not near enough to give gale force to the wind.

The British Islands are probably less favourably situated for the successful issuing of storm warnings to our own coasts than any other country, since they are in the direct path of the Atlantic storms, and they have not the advantage of any stations within reasonable distance to the westward beyond their limits by which they may be warned, so that it often happens that a storm is almost upon us before its approach is foreseen. An attempt was made some years ago to moor a vessel at the entrance to the English Channel and to connect it by a telegraph cable with our coast, but the attempt was a failure, and experience has shown that the step now taken by the Meteorological Office to obtain Atlantic weather information is the only one which promises success.

THE ACTINIÆ[1]

THIS is a work which contains far more than it promises. Though commenced with the intention of describing only the Actinians (sea-anemones) of the Bay of Naples, it has extended until it includes all the species known; and although at first sight it seems nothing more than an ordinary systematist's manual—a dry dictionary for the specialist—it turns out on closer examination to have a clearly-marked individuality of its own. In its preface the author remarks, with a tinge of dry humour which here and there ripples the clear precision of his style, that in these days of papers full of histological detail, or rich with plates of caryolitic figures, embryological sections, or genealogical trees, his big book, apparently so purely systematic, may at first excite among his scientific brethren a smile of compassion, if not indeed a word of contempt. Far, however, from renouncing his intellectual birthright of wider scientific aims, he claims with justifiable pride to have produced (and at a self-denying outlay of time and toil not excelled by that of any histological investigation) no mere arid catalogue of genera and species, but a summary of the whole past of actinology, and a new starting-point for the future. He promises, too, a second volume, in which the anatomy, histology, and development, the physiology, distribution, and phylogeny, will be discussed, and no doubt as exhaustively.

The bibliography alone is well worth notice, for its scholarly precision and thoroughness furnish a royal road

---

[1] "Fauna und Flora des Golfes von Neapel. Le Attinie." Monografia del Dr. Angelo Andres. Vol. I. Bibliografia, Introduzione, e Specigrafia. (Leipzig: Wilhelm Engelmann, 1884.)

© 1885 Nature Publishing Group